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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/574,896	04/06/2006	Shuji Ikegami	4633-0166PUS1	3390

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EXAMINER	
COX, ALEXIS K	

ART UNIT	PAPER NUMBER
3744	

NOTIFICATION DATE	DELIVERY MODE
08/05/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary	Application No.	Applicant(s)	
	10/574,896	IKEGAMI ET AL.	
	Examiner	Art Unit	
	ALEXIS K. COX	3744	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 July 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) *11 and 12* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,8-10 and 14-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. This application contains claims 11 and 12 drawn to an invention nonelected with traverse in the reply filed on 11/10/2008. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 8, and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Sanada et al (US Patent No. 6,041,617).

Regarding claim 1, Sanada et al discloses 4 heat exchangers (1, 2, 7, 9) for effecting heat exchange between cold and hot water and an airstream (cooling water, heat source water, see column 1 lines 49-50 and 59-60; the air circulating within the loop between the four exchangers constituting an airstream), wherein two of the four heat exchangers are made up of air heat exchangers (7, 9) which mainly perform air sensible heat processing and the other two heat exchangers (1, 2) are made up of adsorption heat exchangers which mainly perform air latent heat processing with an adsorbent supported on a surface thereof, a first switching mechanism (15a, 15c, 19a,

19c, see figure 1) for switching a direction of cold and hot water flow so that hot water flows through one of the adsorption heat exchangers while cold water flows through the other adsorption heat exchanger, and a second switching mechanism (15b, 15d, 19b, 19d, see figure 1) for switching the direction of cold and hot water flow so that hot water flows through one of the air heat exchangers while cold water flows through the other air heat exchanger.

Regarding claim 8, Sanada et al discloses a control unit (not shown, see column 17 lines 23-24) which switches the flow of the cold and hot water in the cold and hot water circuit via valves 15a-15d and 19a-19d, and the distribution of air via vapor discharge valves 3 and 4, to thereby perform a) a moisture absorbing operation in which, while cooling an adsorbent in an adsorption heat exchanger, moisture in an airstream flowing through the adsorption heat exchanger is adsorbed by the adsorbent, and b) a moisture releasing operation in which, while heating an adsorbent in an adsorption heat exchanger, moisture is released to an airstream flowing through the adsorption heat exchanger, as these steps are part of the what an adsorption heat exchanger is and does.

Regarding claim 9, the controller of Sanada et al is provided with a switching interval setting part for setting, depending on the latent heat load, a time interval at which switching between the moisture absorbing and moisture releasing operations is accomplished (see figures 9 and 10).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sanada et al (US Patent No. 6,041,617).

Regarding claim 10, it is noted that Sanada et al does not explicitly disclose the system to be configured such that as the latent heat load increases the time interval at which switching between the moisture absorbing operation and the moisture releasing operation is accomplished is set to a lower value. However, as the purpose of switching between moisture absorbing and moisture releasing is to permit the moisture absorption to continue to work because the adsorbent has a finite capacity, it would have been obvious to one of ordinary skill in the art at the time of the invention to program the controller to switch more frequently when saturation occurs more rapidly, as is the case when there is a larger latent heat load.

8. Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sanada et al (US Patent No. 6,041,617) in view of Rhodes (US Patent No. 4,786,301).

Regarding claims 13 and 14, it is noted that Sanada et al does not explicitly disclose the airstream passing through the air heat exchangers to do so without passing through the adsorption heat exchangers, and the airstream passing through the adsorption heat exchangers to do so without passing through the air heat exchangers. Rhodes explicitly discloses that multiple arrangements of adsorbent and traditional heat exchangers, including series and parallel, are equivalent and obvious variants on the system (see column 13 lines 20-27). The parallel arrangement of Rhodes would result in the airstream applied to the latent heat exchangers not passing through the sensible heat exchangers, and the airstream applied to the sensible heat exchangers not passing through the latent heat exchangers. As the systems of Rhodes and Sanada et

al are similar in structure and function, it would have been obvious to one of ordinary skill in the art to apply the variant patterns of Rhodes patent to system of Sanada et al in order to better fit the system into available space.

9. Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sanada et al (US Patent No. 6,041,617) in view of Halene (US Patent No. 4,995,235).

Regarding claims 15 and 16, it is noted that the three-way valve switching mechanisms claimed are not present in Sanada et al. The four three-way valves of Halene (7, 16, 17, 8, see figure 1) comprise a single switching mechanism equivalent to the one disclosed by the applicant in figure 21, comprised of valves A1, A2, B1, and B2. The three-way valves of Halene permit reversal of hot and cold water through heat exchangers 5 and 12 without requiring reversal through heat exchangers 19 and 23. Additionally, the heat exchangers 5 and 12 of Halene are hydrogen reservoirs, which may be considered equivalent to sorbent heat exchangers in that they hold more when cold than when hot, and this is why they are temperature-controlled. It would therefore have been obvious to one of ordinary skill in the art at the time of the invention to use the switching mechanism of Halene for each pair of heat exchangers in the system of Sanada et al, in order to permit switching hot and cold flows such that the overall sorbent heat exchangers may be reversed and continue to operate the system while recharging, rather than requiring a shutdown of water flow to one set of sorbent and air heat exchangers while the other is recharged.

10. Claims 1, 8-10, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rhodes (US Patent No. 4,700,550) in view Yonezawa et al (US Patent No. 5,005,371).

Regarding claim 1, Rhodes discloses an air conditioning system comprising four heat exchangers for effecting heat exchange between coolant and an airstream (12, 14, 82, 84, see figure 9), wherein two of the heat exchangers are made up of air heat exchangers which mainly perform air sensible heat processing (82, 84) while the other two heat (12, 14) exchangers are made up of adsorption heat exchangers which mainly perform air latent heat processing, as these are what desiccant and conventional heat exchangers do. It is noted that Rhodes does not disclose the use of hot and cold water loops, but instead has a conventional compression-expansion refrigerant system in use. Yonezawa et al explicitly discloses the use of a water loop which runs through a sorption heat exchanger (a) which does mainly latent heat processing, in series with a sensible load heat exchanger (24, 25, depending on valve settings, see figure 3), with valves V1-V4, V, and V' constituting first and second switching mechanisms for switching hot and cold water flow directions in order to cool and recharge the sorption heat exchanger appropriately. It would therefore have been obvious to one of ordinary skill in the art at the time of the invention to use hot and cold water supplies and loops in place of the conventional compression-expansion refrigerant loop of Rhodes in order to maintain effectiveness of the cooling of the system for both sensible and latent loads while reducing the quantity of toxic chemicals, such as conventional refrigerant, in use.

Regarding claims 8-10, it is noted that Rhodes does not explicitly disclose the presence of a control unit which switches the flow of the cold and hot water in the cold and hot water circuit and the distribution of air in order to switch between absorbing and desorbing operations. However, it would have been obvious to one of ordinary skill in the art at the time of the invention to implement an automatic control unit, which had a switching interval part for setting the time interval at which switching between moisture absorbing and releasing operations was accomplished, with the time interval being decreased as the latent heat load increased, in order to not require manual switching when the sorbent material became saturated.

Regarding claim 17, Rhodes discloses an air conditioning system comprising a first adsorption heat exchanger (12) performing latent heat processing and fluidly connected to a first air heat exchanger (82), the first air heat exchanger performing air sensible heat processing; a second adsorption heat exchanger (14) performing latent heat processing and fluidly connected to a second air heat exchanger (84), the second air heat exchanger performing air sensible heat processing. It is noted that Rhodes does not disclose the presence of hot and cold water supplies, such that the cold water supply flows to the first adsorption heat exchanger, the first air heat exchanger, and then back to the cold water supply, and such that the hot water flows to the second adsorption heat exchanger, the second air heat exchanger, and back to the hot water supply. Yonezawa et al explicitly discloses the use of a water loop which runs through a sorption heat exchanger (a) which does mainly latent heat processing, in series with a sensible load heat exchanger (24, 25, depending on valve settings, see figure 3), and

both hot and cold water supplies being present in order to cool and recharge the sorption heat exchanger appropriately. It would therefore have been obvious to one of ordinary skill in the art at the time of the invention to use hot and cold water supplies and loops in place of the conventional compression-expansion refrigerant loop of Rhodes in order to maintain effectiveness of the cooling of the system for both sensible and latent loads while reducing the quantity of toxic chemicals, such as conventional refrigerant, in use.

11. Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rhodes (US Patent No. 4,700,550) in view Yonezawa et al (US Patent No. 5,005,371) and Rhodes (US Patent No. 4,786,301, hereinafter referred to as Rhodes '301).

Regarding claims 13 and 14, Rhodes '301 explicitly discloses that multiple arrangements of adsorbent and traditional heat exchangers, including series and parallel, are equivalent and obvious variants on the system (see column 13 lines 20-27). As the systems of Rhodes '550 and Rhodes '301 are similar in structure and function, it would have been obvious to one of ordinary skill in the art to apply the variant patterns of Rhodes '301 patent to system of Rhodes '550 and Yonezawa et al in order to better fit the system into available space.

12. Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rhodes (US Patent No. 4,700,550) and Yonezawa et al (US Patent No. 5,005,371) in view of Halene (US Patent No. 4,995,235).

Regarding claims 15 and 16, it is noted that the switching mechanisms of Yonezawa et al and Rhodes do not comprise four three way valves each. Indeed, it may be argued that the four three-way valves of Yonezawa et al collectively comprise a single switching mechanism. The four three-way valves of Halene (7, 16, 17, 8, see figure 1) comprise a single switching mechanism equivalent to the one disclosed by the applicant in figure 21, comprised of valves A1, A2, B1, and B2. The three-way valves of Halene permit reversal of hot and cold water through heat exchangers 5 and 12 without requiring reversal through heat exchangers 19 and 23. Additionally, the heat exchangers 5 and 12 of Halene are hydrogen reservoirs, which may be considered equivalent to sorbent heat exchangers in that they hold more when cold than when hot, and this is why they are temperature-controlled. It would therefore have been obvious to one of ordinary skill in the art at the time of the invention to use the switching mechanism of Halene for each pair of heat exchangers in the system of Rhodes and Yonezawa et al, in order to permit switching hot and cold flows such that the overall sorbent heat exchangers may be reversed and continue to operate the system while recharging, rather than requiring a shutdown of water flow to one set of sorbent and air heat exchangers while the other is recharged.

Response to Arguments

13. Applicant's arguments filed 7/08/2010 have been fully considered but they are not persuasive. The reasons are as follows.

It is argued on page 3 that Sanada does not disclose the adsorbent heat exchangers 1 and 2 to be in an airstream. Specifically, it is argued that the substances exchanging heat in exchangers 1 and 2 are coolant and water, not air and water.

"Air", as defined in the Oxford English Dictionary, refers to any vapor (see attached definition #9). Therefore, the vapor which exchanges heat with the water in exchangers 1 and 2 is air, and the flow of it is an airstream.

Additionally, it is clear that there is indirect heat exchange between the water lines and the air being conditioned.

Additionally, it is argued that the condenser and evaporator (7 and 9) do not affect heat exchange between water and an airstream. This is again unpersuasive, for the same reason as the argument concerning heat exchangers 1 and 2.

Further, there is still indirect heat exchange between water lines and the air being conditioned.

It is argued on page 7 that replacing the compressor, accumulator, etc. of Rhodes '550 with the water pipes of Yonezawa would not result in exchange between water and an airstream, because Yonezawa describes heat exchange between refrigerant and air, and refrigerant and water. More specifically, it is argued that because a single system does not teach exchange between water and an airstream, the limitations are met.

First, this is arguing the references separately; it is the combination of Yonezawa and Rhodes '550 that must teach the required exchange, which it does.

Second, Yonezawa teaches exchange between water and air in that air conditioner 25 of Yonezawa most certainly exchanges heat between water and air. The reason the previously presented arguments were persuasive is that Yonezawa does not have two distinct adsorption heat exchangers, not because of a failure to exchange heat between water and an airstream.

Additionally, as claimed, it is the collective exchange of all four exchangers which must go between cold and hot water and an airstream. This is not the same as requiring each individual exchanger go directly from cold and hot water to an airstream.

It is further argued that it would not be obvious to replace all pipes for compressed refrigerant with pipes designed for water, because Yonezawa also describes a compressed refrigerant loop, which is used to heat or cool the water.

As can be clearly seen from the above and previous rejections, it is not just the water pipes of Yonezawa, but also the cold and hot water supplies of Yonezawa, which are used. This complete replacement would not result in a nonfunctional system.

It is further argued that there is “no reason” given to replace the system of Rhodes ‘550, “especially if it performs its intended purpose properly.”

“In order to maintain effectiveness of the cooling of the system for both sensible and latent loads while reducing the quantity of toxic chemicals, such as conventional refrigerant, in use.” (see the last sentence of the paragraph regarding the rejection of claim 1 under Rhodes in view of Yonezawa) is clearly a reason which is given. Even the removal of toxic chemicals to a location further away from the end use points is

commonly accepted to be preferable, as it reduces the risk of exposure by people to such chemicals.

Finally, it is argued that Yonezawa is not analogous to Rhodes because sections a and b of Yonezawa do not effect heat exchange with an airstream. It is not clear why the failure to exchange with air would result in Yonezawa being nonanalogous, or, for that matter, for what reason the combination would not result in the claimed system; it is the airflow pattern of Rhodes, and the water flow pattern of Yonezawa, when combined, which is present in the above rejection and meets the claim language. The systems of Rhodes and Yonezawa are both ultimately directed to temperature control of air; this alone is sufficient to make them analogous.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Yoshimi (US Patent No. 7,685,835), Watanabe (US Patent Application Publication No. 2010/0132914), and Seefeldt (US Patent No. 7,716,943) all disclose relevant systems.

15. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALEXIS K. COX whose telephone number is (571)270-5530. The examiner can normally be reached on Monday through Thursday 9:00a.m. to 6:30p.m. EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frantz Jules or Cheryl Tyler can be reached on 571-272-6681. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/AKC/

/Frantz F. Jules/
Supervisory Patent Examiner, Art Unit 3744